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# Beating the Odds:

## *A New Framework for Prudent Federal Budgeting*

William B.P. Robson

***In this issue...***

*Ottawa has fallen into the bad habit of padding the bottom line in its budget projections. Then, when extra fiscal room appears — $34 billion over the last five years — Ottawa responds with spending hikes. This study proposes a more realistic probability-based model for budget planners that would help Parliament achieve a long-term plan of debt reduction and tax relief.*

## *The Study in Brief*

What started out as a good way for Ottawa to avoid deficits "come hell or high water" has turned into a liability. Over the last decade, Ottawa has fallen into the habit at budget time of underestimating revenues, overestimating interest costs, or both, and low-balling spending forecasts for the year. In the last five years alone, the result has been extra fiscal room totaling $34 billion, or an average of $6.8 billion annually. But this unneeded fiscal room is turning into massive in-year spending hikes at the expense of long-term planning and tax relief.

This *Commentary* argues for a new approach based on the inescapable fact that surprises will always make Ottawa's bottom line vary from what was budgeted. It proposes a more realistic model for budget planners that takes uncertainties into account. This paper shows how multiple runs of this model — in which uncertain variables such as economic growth, tax yields, and interest rates vary from run to run — can help the government make educated guesses about the risks associated with a given fiscal plan.

Such an exercise would help frame a course for spending or tax relief that makes the odds of a good outcome — achieving a given debt target, or avoiding a deficit over a given period — comfortably high. It could also establish a range of "respectable" error around the bottom line outcome that, akin to the one-percentage-point band around the Bank of Canada's inflation-control target, would let Parliament steer a steady course through temporary swings in fortune.

Making a range of outcomes, rather than a point forecast, the backdrop for fiscal planning would produce targets with more substance and reliability than the current practice of arbitrarily setting aside several-billion-dollar amounts for contingency reserves. It would reduce the embarrassment of point forecasts that are inevitably missed. And it would mitigate the pressure to spend first, and ask why and how later, evident in recent budgets and legislation.

A complementary change would create a new agency to perform the probability-based modeling. Separating the creation of the economic and fiscal backdrop from the laying out of the fiscal plan avoids the appearance of conflict of interest. And institutional separation would permit open discussion of uncertainties about the economy and the impact of fiscal policy that are awkward for the minister of finance and his officials to acknowledge.

Ad hoc legislation along the lines of Bills C-48 and C-67 offers Canadians poor odds of escaping their current fiscal trap. The probability-based framework outlined in this *Commentary* could improve those odds.

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Since the mid-1990s, the framework for federal budgets has put avoiding deficits front and centre. This approach — exemplified in former finance minister Paul Martin's commitment to hit his fiscal targets "come hell or high water" (Martin 1995) — succeeded stunningly in ending the unsustainable borrowing that inspired it. In recent years, however, the bottom-line padding that is central to the hell-or-high-water approach has promoted unsustainable spending increases and cast doubt on Parliament's ability to control public finances.

Neither legislation to force a balanced budget nor arbitrary formulas for dividing unexpected surpluses among spending, tax rebates, and debt repurchase will address these problems.[1] A better approach would formally acknowledge that surprises will always make Ottawa's bottom line vary from what was budgeted; set targets for taxes and spending that make the odds of an unacceptably bad outcome comfortably low; and recognize that variation within a pre-established range — somewhat akin to the 1-percentage-point band either side of the Bank of Canada's 2 percent inflation target — is not a cause for political embarrassment. This *Commentary* outlines changes to the forecasting framework and the institutional responsibility for it that could keep Ottawa on a path to lower debt and promote better stewardship of Canada's public finances.

## The Obsolete Hell-or-High-Water Framework

The roots of current federal budgetary practices lie in the unsustainable deficits of the early 1990s. The newly elected Liberal government, with Paul Martin as finance minister, won power on a platform that took a casual approach to fiscal problems. But after a weak first budget and turbulent financial markets added a threat of crisis to the mix, the government changed course. Its 1995 budget adopted a framework focusing relentlessly on short-term targets to balance the budget — a framework the finance minister said would hold the government's feet to the fire to ensure the targets were hit "come hell or high water."

### *Initial Success*

Because ending deficits required controversial budget changes and federal fiscal credibility was low, the government initially used two complementary tactics to ensure that it hit its bottom-line target. In the early years, the projections that served as the baseline for policy initiatives used economic forecasts and fiscal

I thank Stephen Tapp for his modelling work for an earlier version of this paper, and Danielle Goldfarb, Yvan Guillemette, Jack Mintz, Tim O'Neill, Finn Poschmann, Bill Scarth, and several anonymous reviewers for comments. Responsibility for conclusions and blame for errors attach to me.

1 On the former possibility, see Ivison (2005). The latter approach was embodied in Bill C-67, the *Unanticipated Surpluses Act*. A rule that stipulated that all unexpected surpluses be assigned to debt reduction might appear to address these problems. Not long ago, however, it was common sense that surpluses did pay down debt. The problem has arisen because the federal government has become increasingly imaginative in ensuring that actual surpluses — the kind that do pay down debt — do not arise.

assumptions that produced pessimistic outcomes for the budget balance.[2] So, middle-of-the-road outcomes — indeed, most outcomes short of catastrophe — would let Ottawa overachieve its target. A second practice, which still persists, was the resort to explicit padding — dollar amounts for economic prudence and contingency reserves — to cover unexpected revenue shortfalls or spending overruns. This practice also helped the federal government do better on average than it had projected.

The hell-or-high-water framework restored Ottawa's fiscal health. From a deficit of $36.6 billion in fiscal year 1994/95, the federal budget balance moved to a surplus of $20.2 billion by 2000/01. That swing capped, then reduced, the claim of federal interest payments on the economy. By reassuring investors that Ottawa would neither renege on its debt nor devalue it with inflation, the framework set the stage for lower interest rates and better macroeconomic performance in this decade.[3]

### *Later Problems*

Notwithstanding hell-or-high-water's success in achieving surpluses, events since the late 1990s have shown its defects as a permanent fiscal framework. The chronic pessimism of budget projections eroded the credibility of the minister of finance personally and the government more generally. That erosion lowered the barriers to in-year spending increases in response to better-than-projected revenue. And mounting in-year spending increases have undermined Parliament's credibility as an effective steward of Canada's public finances.

This deterioration is a direct effect of overpessimism about the fiscal environment in budget after budget. Compare the annual change in federal revenue forecast in each year's budget to the change in revenue shown in the public accounts at the end of the fiscal year (Figure 1; Box 1 explains the advantages of comparing annual changes, rather than levels). In eight of the ten years since the 1995 budget, revenue has exceeded projections. Since 2000, the record is five for five, and the cumulative overrun during that period is $29.0 billion — an average of almost $5.8 billion each year.

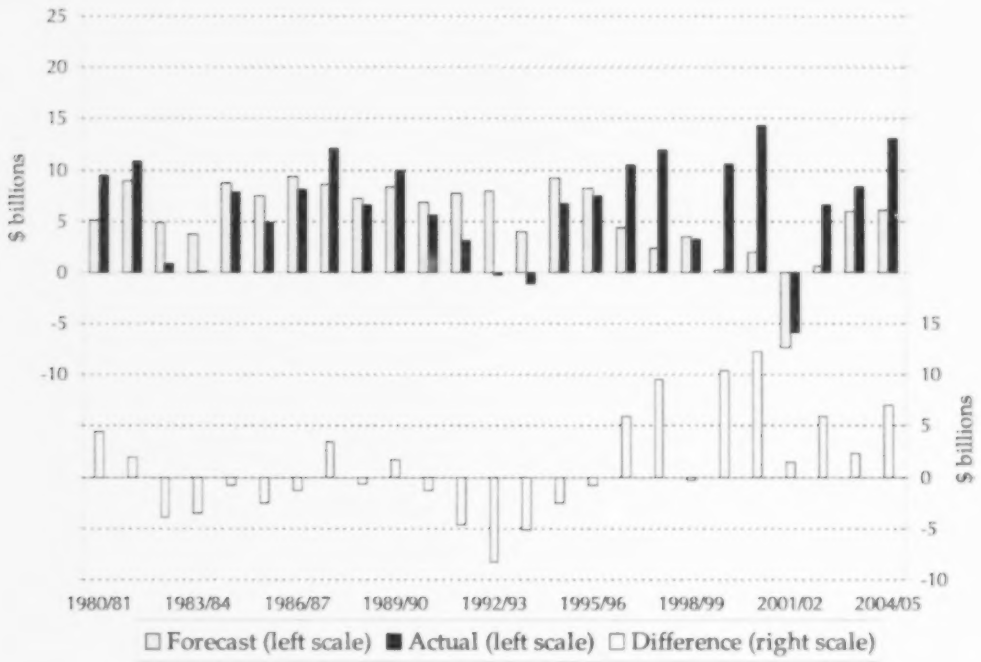
When it comes to interest costs, the differences between budget projections and results are smaller in dollar terms, but the pattern is even more consistent (Figure 2). In all 10 fiscal years since the 1995 budget, federal net interest payments have come in lower, and supportive of a positive bottom line, than the budget projected. Over the five years since 2000, the cumulative difference is $4.9 billion — an average of about $1.0 billion annually.

Considering the revenue and interest differences together is instructive, because helpful surprises in either of them create extra "fiscal room" that Ottawa can spend or allow to flow through to an improved bottom line. Adding unexpected revenue to unexpected interest savings shows that total fiscal room has been larger than projected in all 10 fiscal years since 1994/95 (in the two years

2 O'Neill (2005) provides a comprehensive look at the sources of errors in budget forecasts.

3 See Fillion (1996) and Del Castillo and Fillion (2002) for estimates of the effects of public debt on interest rates.

**Figure 1:** *Changes in Federal Government Revenue, fiscal years 1980/81 to 2004/05 (budget forecasts versus Public Accounts)*




Sources: Annual budgets and Public Accounts for years shown; author's calculations.

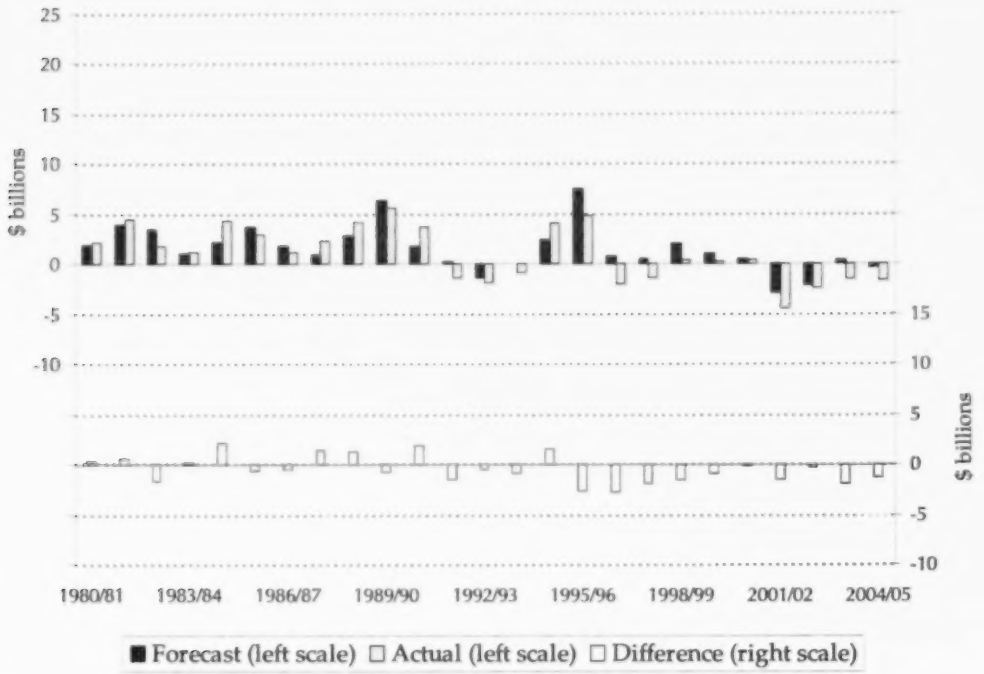
**Box 1:** *Measuring Federal Budget Projections against Results*

The simplest way of measuring federal budget projections against actual results is to look at the projections against the most recent historical figures published in the Public Accounts. Such comparisons, however, are less informative than comparisons of projected and actual changes in revenue and spending for each fiscal year.

One problem with comparisons of levels arises from the fact that the federal government has made changes over time — most importantly, a move to more complete accrual accounting — in its recording of key revenue and spending items. The most recent historical figures, therefore, are not consistent with the figures budget makers were working with in the past. Comparisons of each year's budget and Public Accounts are less affected by those changes.

Less happily, comparisons of changes are better than comparisons of levels because the figures in federal budgets net important items out of revenue and spending. The most notable example is the Child Benefit, which the Public Accounts record in spending, where it belongs, but which the budget nets against personal income tax revenues. Because such items total some $13 billion annually, the federal government's revenue and spending look considerably smaller in budgets than in the Public Accounts, and comparing budgeted revenue and spending to outcomes is correspondingly difficult. Comparisons of annual changes are less affected by netting.

**Figure 2:** *Changes in Interest Payments on Federal Government Debt, fiscal years 1980/81 to 2004/05 (budget forecasts versus Public Accounts)*



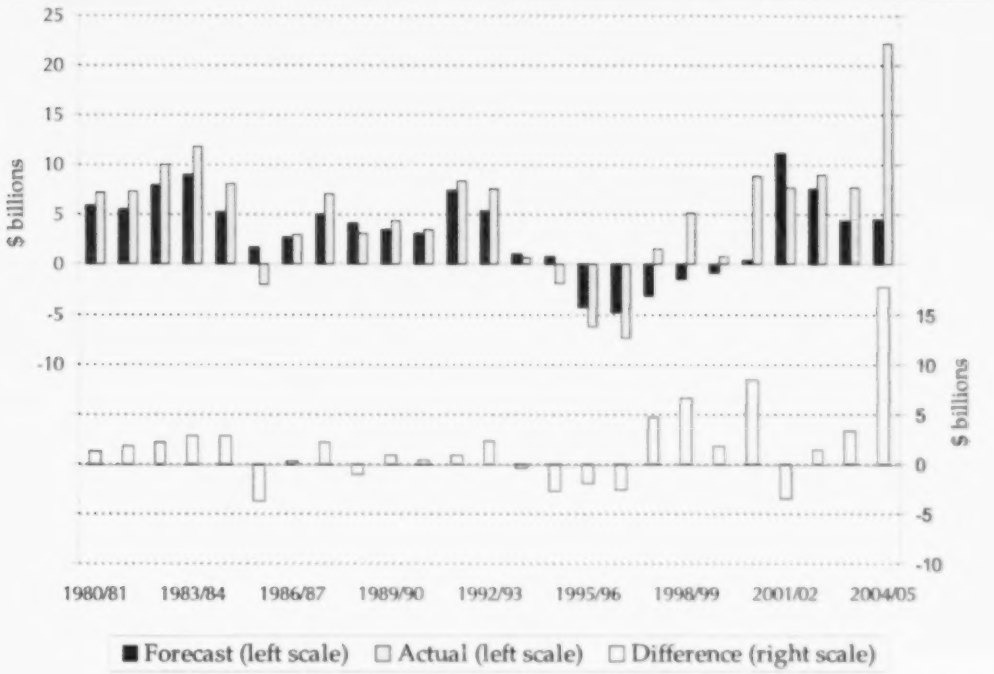

Sources: Annual budgets and Public Accounts for years shown; author's calculations.

with revenue shortfalls, interest savings exceeded the shortfalls). In the most recent five years, total unexpected fiscal room amounts to $34.0 billion — an average of $6.8 billion annually.

If all this extra fiscal room had turned into surpluses, the turnaround in Canada's public finances would have been even more dramatic than it was. But the objectionable practice of continually presenting Parliament and the public with misleading numbers began, over time, to foster another use of these in-year surprises: in-year spending that also was not anticipated in the annual budgets (Figure 3).

While the hell-or-high-water framework ruled deficits out, it made no explicit virtue of the surpluses that, in an uncertain world, must occur on average to stop unexpected setbacks pushing the bottom line into the red. So the focus on a bottom line that would never go below zero but also never much above it converted large amounts of unexpected fiscal room into spending. In seven of the 10 years since the 1995 budget, the federal government has spent more on programs than the budgets forecast. In the past five years, the record is four for five — the only exception being 2001/02, when the budget was not presented until December and essentially reported an overrun that had already largely been spent.

**Figure 3:** *Changes in Federal Government Program Spending, fiscal years 1980/81 to 2004/05 (budget forecasts versus Public Accounts)*




Sources: Annual budgets and Public Accounts for years shown; author's calculations.

During those five years, the cumulative overrun is $27.3 billion — some $5.5 billion annually.

The results for the most recent complete fiscal year, 2004/05, close this narrative with a humourless exclamation point: the towering final bar in Figure 3. The 2004 budget projected an increase in program spending of $4.5 billion; the actual increase was $22.2 billion. The $17.7 billion difference is an overrun on a mind-boggling scale — larger than the amount Ottawa spent that year on employment insurance ($14.7 billion), fiscal equalization ($13.3 billion), or defence ($13.9 billion). It was equal to almost one-fifth of federal gross personal income tax collections, more than half what Ottawa collected in corporate income tax and the goods and services tax (GST), and an astonishing 59 times larger than the much-ballyhooed $300 million that income trusts were estimated to "cost" the federal treasury. In the wake of an overrun on such a scale, it is scarcely an exaggeration to say that the numbers parliamentarians see in each year's budget risk becoming useless.

Nothing in recent history suggests this record will improve. In the spring of 2005, by passing the *Act to Authorize the Minister of Finance to Make Certain Payments* (Bill C-48), the last Parliament gave up even more authority to hold the executive to account. That act authorized, for the next two fiscal years, up to $4.5 billion more in post-year-end spending on a wide range of objectives by almost any means — clear evidence that the federal government had decided to spend

first, and think later about why and how.[4] Bill C-67 (the *Unanticipated Surpluses Act*) would have authorized further spending in the next two fiscal years and further distributions of surpluses larger than the contingency reserve after that. Happily, this attempt to institutionalize last-minute splurges died with the election call, giving Canadians a valuable chance to rethink their approach to federal budgeting.

## *Burdensome and Destabilizing Fiscal Policy*

Although enough members of the last Parliament were sufficiently comfortable with the degeneration of the budget process to tolerate a $17.7 billion spending overrun in fiscal year 2005/05 and to pass Bill C-48, Canadians should demand a different attitude from their successors. Fiscal policy is a powerful tool, and Ottawa's adeptness in deploying its taxing and spending powers matters for many reasons.

One effect of these overshoots is that the federal government is growing — not because of deep thinking about national priorities, but simply because the money is there. Advocates of tax relief were told repeatedly that Ottawa could not "afford" significantly lower taxes on middle- and lower-income Canadians. That claim is hard to square with the more than $27 billion of in-year spending increases that has occurred over the past five years. And notwithstanding the superficially plausible defence that much of the spending is one-off,[5] such one-time payments ratchet up expectations, and the subsequent drops in spending they should produce are not evident in the aggregate numbers.

Perhaps Parliament would have approved budgets that called for program spending to grow from $119.6 billion in 1999/2000 to $175.9 billion in 2004/05. But we do not know, since MPs and their constituents had no chance to debate half of that increase at budget time, when they could have considered alternatives, such as tax relief, that require action in advance. In retrospect, we can see how big the opportunities were. Ottawa could have reduced the inordinately high marginal effective tax rates it imposes on investment, workers, low-income seniors, and modest-income families with children (Mintz et al. 2005). Those opportunities have passed, but the new government should not similarly squander future ones.

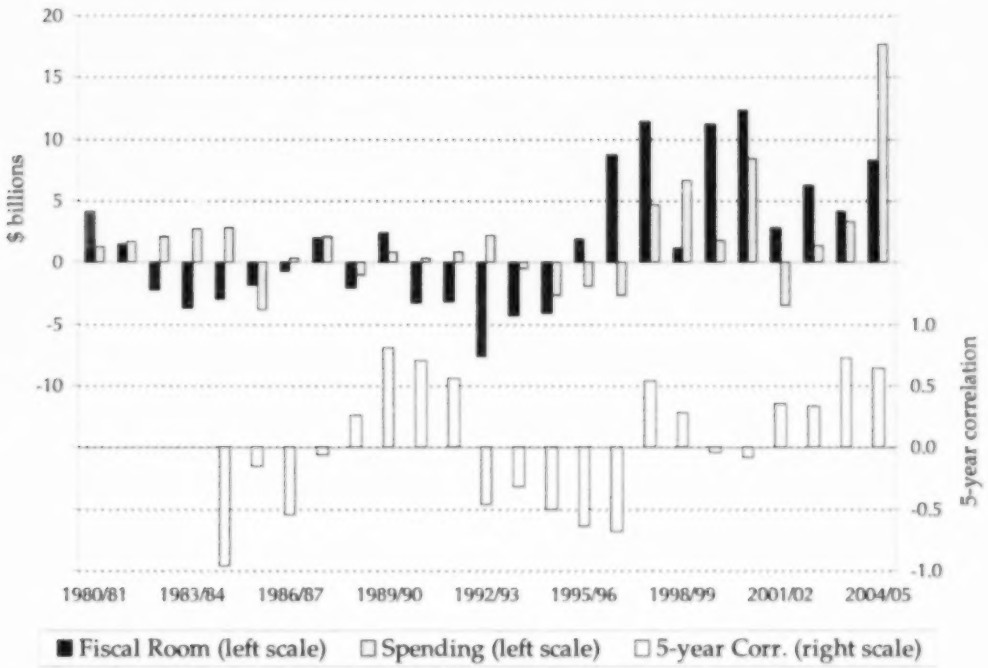
A second reason for disliking the current framework is that governments that spend up to their incomes increase outlays when times are good and cut them when times are bad. Even people who doubt fiscal policy's ability to stabilize the economy in traditional Keynesian fashion will dislike the disruptions to tax rates and programs needed to balance the budget annually when the economy goes through cycles.[6] Those who think fiscal policy can smooth demand will see further

4 The November 2005 Economic and Fiscal Update (Canada 2005, 95) details some $9.4 billion in new spending between fiscal years 2005/06 and 2010/11 as consistent with the *Act*.

5 The November 1995 Economic and Fiscal Update (Canada 2005, 59) presents a breakdown to support the claim that half the 2004/05 overrun was a one-time occurrence.

6 Confidence in traditional Keynesian demand-smoothing fiscal policy has declined in recent years. See Lam and Scarth (2002) for a recent investigation. Robson and Scarth (1997) made the same point when the fiscal consolidation was just getting under way.

**Figure 4:** *Difference between Federal Government Fiscal Room and Program Spending, fiscal years 1980/81 to 2004/05 (budget forecasts versus Public Accounts)*




Sources: Annual budgets and Public Accounts for years shown; author's calculations.

reason to let spending rise and revenue fall during slumps, and let spending fall and revenue rise during booms.

Both lines of thought suggest that surprises in fiscal room and spending should usually be in opposite directions. That is, when revenue comes in lower than expected, spending should typically be higher than expected, and vice versa.[7] That pattern prevailed at times over the past quarter-century, when a measure of the five-year correlation between the two types of surprises has a negative sign (Figure 4). The opposite pattern of positive correlations between the two is disconcertingly common, however, and has recently been pronounced.

During the late 1980s and early 1990s, the Progressive Conservative government followed a strategy — insufficiently ambitious as it turned out — of bottom-line targets. Then, the correlation between fiscal-room surprises and program-spending surprises was positive. Since the mid-1990s, it has been positive

7 Combining revenue and interest surprises in one measure of fiscal room has an advantage over considering the two categories separately, as other studies (such as Stanford 2005) have done. If a weak economy causes interest rates to fall or a strong economy causes them to rise — in other words, to move in the opposite direction to program spending — the net effect of the cycle on total spending is ambiguous. In Ottawa's case, specifically, large and variable foreign-exchange reserves yield investment income, which adds to federal revenues, while their counterpart debt adds to interest payments. Considering revenue and interest surprises together nets the opposing influences of changes in the quantity of foreign-exchange reserves and the interest rate they earn on the one hand, and the counterpart changes in debt and its servicing cost on the other.

again. A habit formed when growth was remarkably stable and tax revenues were generally robust could force an abrupt cut in spending or a slide into deficit when, as is inevitable some day, the economy hits a rough patch.

One key benefit of balancing the budget should have been more freedom to set long-term priorities in taxation and programs without being pushed off course by bottom-line concerns. Sticking with the hell-or-high-water framework after the budget was in surplus and the debt was declining stopped Canadians enjoying that benefit.

## A Superior, "Calculated-Risk" Framework

Having been assured of no deficits by the hell-or-high-water budget framework, Canadians are understandably leery about abandoning it. When O'Neill (2005) urged targeting a surplus over an economic cycle instead, many reacted with alarm to the idea that occasional deficits might be acceptable.[8] As O'Neill himself noted, the difficulty of certifying that the fiscal rule was being followed was an important drawback to his proposal. What kind of framework might allow some flexibility for the budget outcome to vary from what was forecast, while preserving accountability for the health and sustainability of Ottawa's financial position?

### *Thinking More Subtly about Fiscal Risks*

Because this problem is complex, its solution is layered. A key first stage — already largely present in the current framework — is formally to acknowledge risk and uncertainty. Economists are unsure about current measurements of the economy and fiscal aggregates and about the relationships between variables in their models. They are unsure how big and how frequent outside shocks will be. And since there are different models, each of which seems at least partly plausible, economists have no systematic way of combining their predictions.

The economic prudence factors in the budgets of the past decade recognized the doubts that plague projections about the outlook. Dealing with such unknowns by padding the bottom line by several billion dollars is crude, however. A single dollar figure implies 100 percent assurance that deviations smaller than that amount will let Ottawa hit its target and zero assurance that larger deviations will let it hit its target. Most real-life risks have no such hard boundaries. A better way of expressing risk, as gamblers, weather forecasters, and business risk managers know, is to describe distributions of possible outcomes, most of which are fairly close to the likeliest one and which get progressively fewer as the variations get more extreme.

Thinking about distributions of economic and fiscal outcomes, rather than point forecasts, may look exotic. Even when forecasters provide alternatives to their "best" estimate, they usually provide a small number of alternative point

8 See, for example, Watson (2005), Maich (2005) and "Don't risk undermining the anti deficit attitude," *Globe and Mail*, June 22, 2005, p. A14.

forecasts. Systematic surveys of distributions of forecasters' expectations are rare.[9] Models for estimating value-at-risk have become familiar in many financial activities, however, and the development of financial instruments based on economic indicators is beginning to yield useful information about the uncertainties attached to high-frequency measures of inflation and growth, and their relationship to disagreement among forecasters (see Gürkaynak and Wolfers 2006).[10] The core task is to design a model of the economy and the government's budget that is simple enough to use easily, but that captures essential unknowns such as variations in growth and interest rates. The next step is to simulate a large number of fiscal outcomes, letting the variables about which there are crucial doubts take different values, within a plausible range, in each model run.

Such an approach has key advantages. One insight from simulating models with non-linear elements — the compounding of debt being a simple example — is that the likeliest result from a large number of runs with different values for uncertain variables is typically different from the solution using the best-guess value for each variable. Forecasters not only understate the uncertainty in their minds when they make point forecasts, their forecasts could also be biased relative to their own probabilistic assessments.[11] Most obviously, probabilistic approaches downplay the importance of point forecasts that are certain to be wrong, and instead allow informed estimates of the odds that a given action will achieve something good or avoid something bad.

## *An Illustration Using a Target for a Lower Debt-to-GDP Ratio*

To make this idea more concrete, imagine a fiscal framework that aims, as the previous Liberal government announced, for a lower ratio of net public debt to gross domestic product (GDP). The headline promise was to get the ratio below 25 percent by fiscal year 2014/15, although, for a time horizon more pertinent for budget planning, one can take the interim benchmark of 30.5 percent by 2010/11 shown in the 2005 Economic and Fiscal Update.[12] A simple model that builds on recent fiscal results can generate a distribution of debt-ratio outcomes by 2010/11 for any path of program spending. With those distributions in hand, fiscal

9 One notable exception is the Survey of Professional Forecasters conducted by the Federal Reserve Bank of Philadelphia; see Internet web site: www.phil.frb.org/files/spf.

10 The C.D. Howe Institute did some early work on quantifying fiscal risks (Robson 1994; Robson and Scarth 1999), and others both outside and inside government have done the same using simple (Boothe and Reid, 1998; Hermanutz and Matier, 2000) and more complex models (Hostland 2003). A useful account of the need for central banks to take account of uncertainty in formulating policy is Jenkins and Longworth (2002). For an early investigation of the implications of risk and uncertainty for the task of staying inside an inflation-control band, see Black, Macklem, and Rose (1997). Brock, Durlauf, and West (2003) explore the task of choosing among plausible models.

11 Analysis of one survey in which respondents provide point forecasts as well as ranges of outcomes suggests that many forecasters pick single numbers that are higher, in the case of growth, and lower, in the case of inflation, than the central tendency of their own probability distributions (see Engleberg, Manski, and Williams 2006).

12 This is the figure shown in the Update (Canada 2005, 15) for the circumstance when the annual contingency reserve is used up. The Update announced a further debt-ratio target of 20 percent by 2020, not a meaningful time-frame from an accountability point of view.

planners can choose a path for spending that makes the chance of missing the target comfortably small.

The model I use for this illustration is purposely bare bones. It contains a handful of variables that describe the economy, key fiscal aggregates, and interest rates. Their starting values are actual figures from calendar year 2005 for national accounts variables and from fiscal year 2004/05 for fiscal variables. Its projections use a mix of baseline data from the private sector forecasters sampled in the 2005 Economic and Fiscal Update and fluctuations that reflect historical data from 1996 to 2004 — the period during which the Bank of Canada targeted and, on average, almost exactly hit an annual inflation rate of 2 percent.

To provide some sense of the risks to the outlook, in each run I varied four random elements in the model — the average annual growth rate of GDP, shocks to GDP around its trend growth rate, shocks to tax collection, and shocks to long-term interest rates — using the following assumptions.

- Nominal GDP grows, on average across all model runs, at an annual rate of 4.9 percent, equal to its actual average growth rate over the period from 2000 to 2005, and equal to the average annual growth projected by the private forecasters in the 2005 Economic and Fiscal Update. The average growth rates for real GDP over the eight five-year periods from 1965 to 2005 had a standard deviation of 0.9 percentage points. Since that figure reflects some long cycles in output before inflation targeting, I make the variations of trend GDP growth from run to run in my projections smaller: their standard deviation is 0.5 percentage points.[13]
- Annual fluctuations of GDP around its trend from 1995 to 2005 were 1.4 percentage points. I use the same figure for future annual fluctuations around the trend growth rates just described.
- The ratio of tax revenue to GDP fluctuates around a baseline of 15.79 percent in fiscal year 2005/06 and 15.43 percent thereafter, allowing for the immediate 1 percentage point cut in the GST that the new Conservative government intends to make. Over the full period from 1996 to 2004, the standard deviation of the tax ratio was 0.79 percentage points. Allowing for major changes in tax rates by calculating the standard deviation relative to the means of two different fiscal periods — from 1996/97 to 2000/01 and from 2001/02 to 2004/05 — yields a figure of 0.11 percentage points. The figure I use for annual fluctuations here is simply the average of those two: 0.45 percentage points.
- The effective interest rate on net federal debt fluctuates around an average rate of 4.9 percent, equal to the average projected growth rate of nominal GDP over all the model runs. Over the period from 1996 to 2004, the standard deviation of Ottawa's effective interest rate was 0.46 percentage points, and its standard deviation around its (declining) trend was 0.18

13 Allowing for inflation at 2.0 percent and growth in the prime working-age population of 1.0 percent annually, this assumption is akin to saying there is a two-thirds likelihood that the productivity of the potential workforce will grow at an average annual rate between 1.4 percent and 2.4 percent between 2005 and 2010.

percentage points. In my runs, I use the average of the two: 0.32 percentage points.[14]

Running this model many times produces distributions of outcomes for key variables. To the extent the assumptions behind them appear reasonable, the outcomes help evaluate the probability of achieving or missing a given target.[15]

Figure 5 shows the results for the debt ratio in fiscal year 2010/11 from 20,000 runs of the model under different rates of program spending growth, allowing a quick view of the chance of hitting or bettering a 30.5 percent debt ratio in each case.[16] The curve on the far right shows the results when program spending grows by 8.0 percent annually — the rate recorde ' over the past five years. The share of the 20,000 runs involving such rapid spending growth that leaves the debt ratio near the target is very small: about 8 percent. The second curve from the right shows the results when spending grows 5.9 percent annually — the rate recorded since fiscal year 1996/97. Program spending growing at that rate leaves the debt ratio at or below the target much more often: in almost 90 percent of the runs. These two sets of results support many observers' intuition that recent federal spending increases are not obviously compatible with the kind of fiscal prudence the "hell-or-high-water" framework is supposed to guarantee. No government could be comfortable presenting Parliament and the public with a fiscal plan in which the odds of missing the debt target it has identified as desirable are greater than 90 percent. Whether odds of missing the target greater than 10 percent would be acceptable is open to debate.

The two curves on the left of Figure 5 show the results from other possible spending paths. The second curve from the left, showing the scenario in which spending grows at the same average rate as GDP (4.9 percent), the debt ratio ends up below 30.5 percent in about 99 percent of the runs. And if spending grows at 2.9 percent annually, the same rate as prices and population — in other words, if it stays constant in real terms per person — achieving the target becomes essentially certain.

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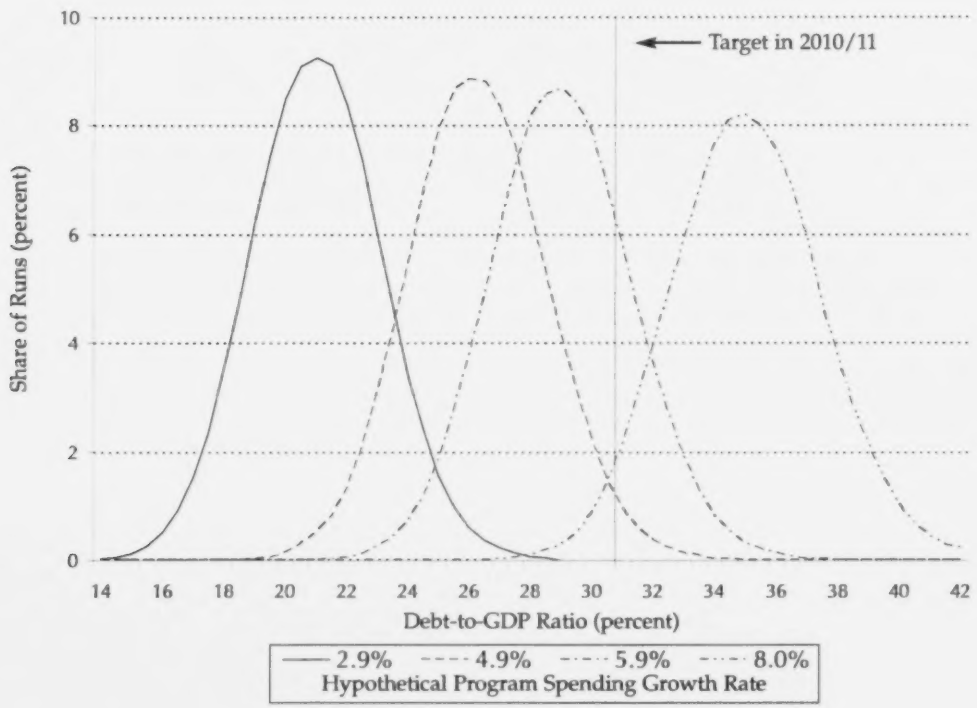
14 Except for the specification of the average interest rate as equal to expected nominal growth, the independence of the growth and interest-rate projections in this exercise may appear unsatisfactory. However, more elegant approaches — such as making short-term interest rates fluctuate with nominal growth as the central bank reacts to changes in growth and inflation — do not repay the effort in a simple exercise of this kind. Among other complicating factors, Ottawa's net interest payments are sensitive on the income side to changes in dividends from Crown corporations and to fluctuations in interest income from Ottawa's large holdings of short-term securities in its foreign-exchange reserves. There is no systematic correlation between nominal GDP growth and the effective interest rate on net federal debt over the 1996-2004 period.

15 Because much information about fiscal year 2005/06 net interest payments is already known, I cut the fluctuations in that variable in the first year of the simulations by half, and raise the expected value of the effective interest rate in 2005 to 5.1 percent.

16 A key simplification in this model is the fixed path for program spending. In the real world, economic fluctuations and emergencies affect spending unpredictably. In this model, however, they are relatively unimportant because movements in nominal GDP that arise in equal measure from real and price shocks affect spending in roughly offsetting ways (Canada 2005, 165-66). As for emergencies, calibrating the model to match recent spending overruns would produce such huge fluctuations that the resulting "safe" spending paths would be negative. So, while formal modeling along these lines for fiscal planning purposes would build in fluctuations related to, say, employment insurance payments, I have left them out in this illustrative exercise.

**Figure 5:** *Federal Government Debt-to-GDP Ratio, fiscal year 2010/11, under Various Program Spending Growth Rate Scenarios*



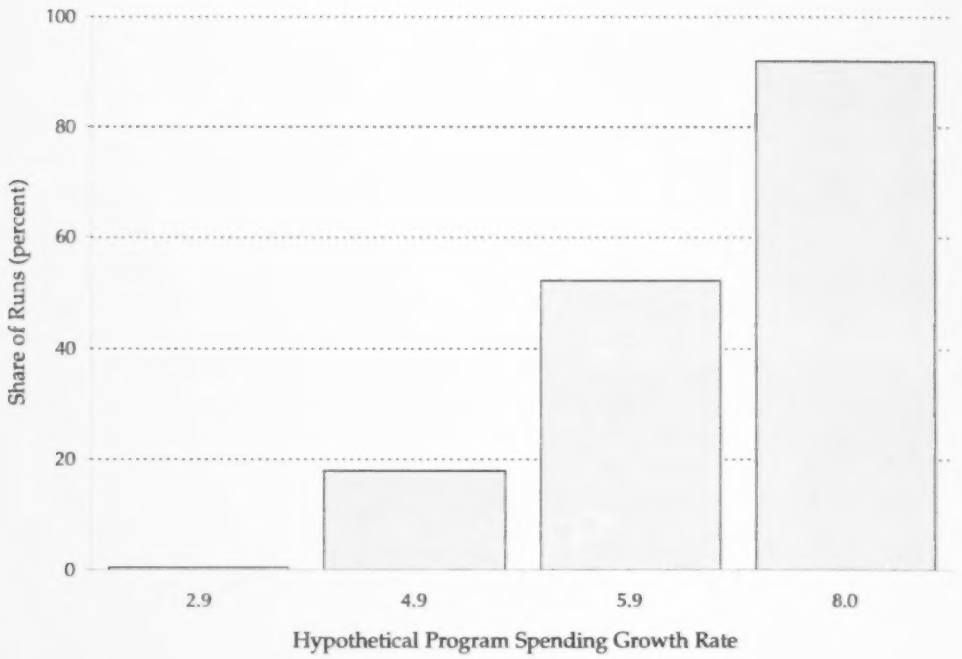

Source: Author's calculations.

## *The Odds of Avoiding Deficits*

What about avoiding a deficit altogether, the touchstone of fiscal probity in the hell-and-high-water framework? Deficits are discrete events, so a different way of illustrating the changing odds with different spending paths suggests itself. Figure 6 summarizes the projections for fiscal years 2006/07 through 2010/11, showing the proportion of the total number of years simulated under each spending scenario (20,000 runs of five years each, or 100,000 years) in which the federal government runs an annual deficit. Not surprisingly, the chance of a deficit varies a lot under such different scenarios for spending: less than 1 percent of the time when spending grows at 2.9 percent annually, ranging all the way up to more than 90 percent of the time when spending grows at 8 percent annually.

One point that emerges clearly from comparing the odds of avoiding deficits with those of achieving the debt ratio is that the debt-ratio target is a considerably less stringent one. The 5.9 percent spending growth path, for instance, achieves the debt target almost 90 percent of the time, yet would allow a deficit in more than half the years. Even severe doubts about the hell-or-high-water framework would not persuade fans of prudent fiscal policy to endorse a federal fiscal plan that anticipated deficits as often as that.

**Figure 6:** *Federal Government Deficits, fiscal years 2006/07 to 2010/11, under Various Program Spending Growth Rate Scenarios*



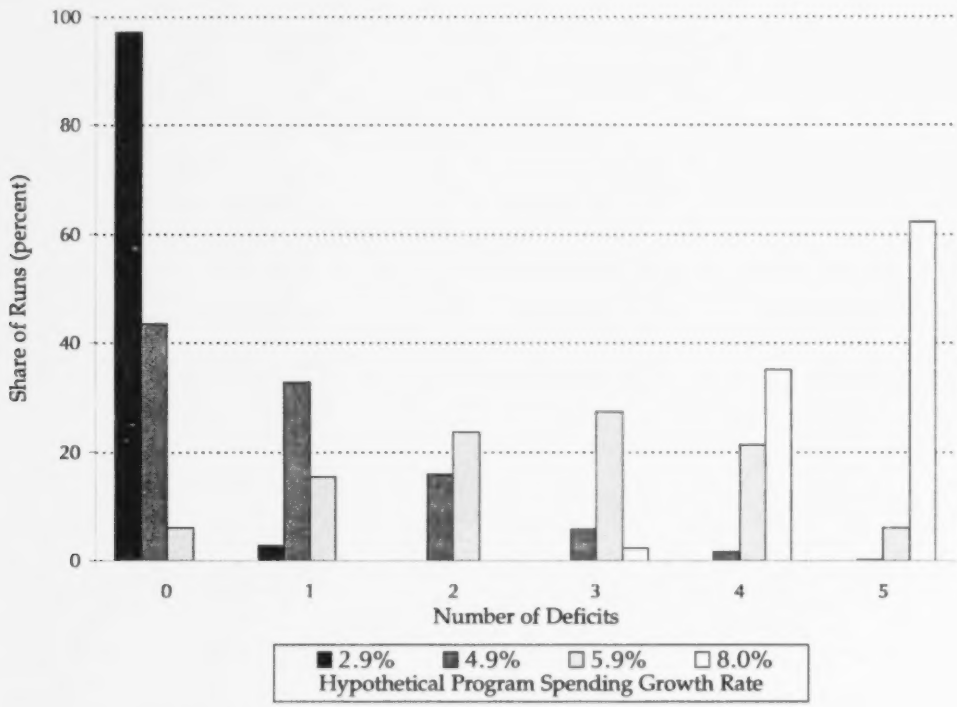

Source: Author's calculations.

Another way of thinking about the odds of avoiding deficits is to look at fiscal plans that take a relaxed view of, say, one deficit in a five-year period, while seeking to keep comfortably low the odds of that happening more often. Figure 7 illustrates the results of model runs under the various spending scenarios in a different manner, highlighting the incidence of deficits in each five-year period.

Spending growth of 2.9 percent essentially guarantees no deficit or only one in a five-year period. With spending growth of 4.9 percent, the chance that no deficit will occur in a five-year period becomes about 44 percent and that of one deficit 33 percent. So the chance of having either of those outcomes drops to 77 percent, and the chance of two or more deficits over the fiscal-planning period rises to 23 percent. With spending growth of 5.9 percent, the odds of having no deficit or only one over the planning period fall almost to 20 percent; with spending growth of 8 percent, they fall essentially to zero.

In practice, a government that followed such an approach would come at the question of the spending path, or a tax-relief program, from the other end. That is, it would decide what the acceptable odds were of missing a target and pick a path accordingly. Figure 8 draws on the same modelling exercise to illustrate the principle. It shows how the chances of running no deficit, of running no more than one deficit, and of hitting a debt target of 30.5 percent in fiscal year 2010/11 change as the annual rate of spending increase rises. To find a target spending

**Figure 7:** *Number of Federal Government Deficits in Five-Year Periods, under Various Program Spending Growth Rate Scenarios*



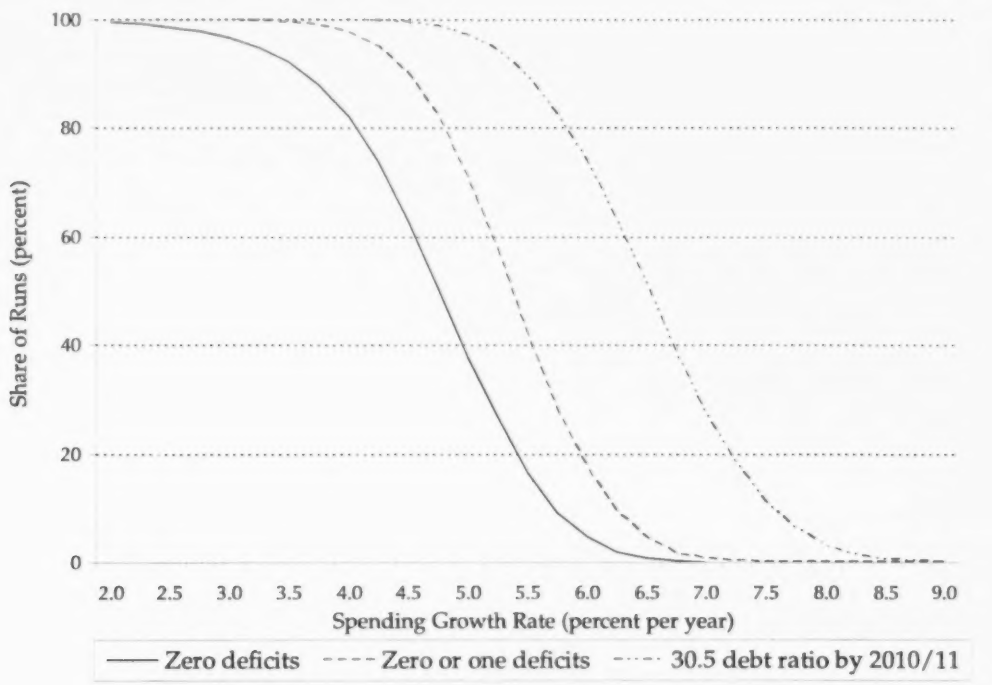

Source: Author's calculations.

path, the policymaker picks odds that appear comfortable, looks across the chart to the pertinent line, and then down for the rate at which spending can grow.

In this example, a government that wanted to limit to 10 percent the odds of running a single deficit would pick a spending growth rate of a little more than 3.6 percent a year. If it was comfortable with 20 percent odds of running a deficit, it could project spending growth a little faster than 4.0 percent a year. If, alternatively, the government wanted to limit to 10 percent the odds of running more than one deficit in the five-year period, it would pick spending growth of 4.5 percent; if it was comfortable with 20 percent odds of running more than one deficit, it could project spending growth around 4.8 percent. If the debt ratio were the target, a government that wanted to limit to 10 percent the odds of missing a debt ratio of 30.5 in 2010/11 would pick a growth rate for spending of a little less than 5.5 percent a year. If odds of 20 percent were acceptable, it could let spending grow at closer to 5.8 percent a year.

Although this way of thinking about fiscal planning is less familiar than Ottawa's current approach, it is similar in some respects. The amount of money earmarked for a contingency reserve and prudence must reflect some view within the government that the odds of a deficit are tolerably low. Formalizing the model and the uncertainties behind such a judgment holds out three promises.

**Figure 8:** *Success Rates for Federal Government Fiscal Targets, under Various Program Spending Growth Rate Scenarios*




Source: Author's calculations.

First, it would give the annual target for surpluses — the target currently embodied in the contingency reserve and prudence factors — more analytical backing. Targeting a surplus over the cycle is a familiar idea, but it says little about how big the surplus should be. A benchmark explicitly calculated to limit the odds of missing a debt or deficit target would be easier to justify than the current numbers, which — being obviously arbitrary — have proved subject to erosion by in-year spending.

Second, this more subtle view of risks could make missing a point forecast — something that will happen essentially 100 percent of the time in the real world — less embarrassing. As long as the variations were within a range justified by the model, good times would create less pressure to spend surprise increases in fiscal room, and lean times would create less pressure to cut back. This framework presupposes nothing about levels of taxes and spending. A medium-term target linked to the level of debt or the budget balance is compatible with either high taxes and high spending or low taxes and low spending. The advantage of the probabilistic approach is that it communicates ahead of time the uncertain nature of budget outcomes. Just as the Bank of Canada's plus-or-minus 1-percentage-point band around its inflation target makes apparent the limits of monetary policy's short-term control of the consumer price index, so a transparent

discussion of forecast risks and their fiscal implications in each budget would indicate that surprises within the range contemplated in the model should not prompt in-year changes.

Third, such a new approach to fiscal planning would mitigate the upward bias to spending that the hell-or-high-water framework and the consequent pressure for in-year splurges creates. Government might still grow, but its growth would be by design, not by accident. The fuzzier boundaries of an explicitly probabilistic approach might let Ottawa set a medium-term spending path that is higher than the path it would choose under the hell-or-high-water approach. With a towering $17.7 billion overrun in spending as recent evidence of that framework's inability to discipline the government during the course of a fiscal year, however, Canadians might see that as an acceptable price to pay for a closer correspondence between the course Parliament charts at budget time and what actually happens.

## An Institutional Note

One objection to this type of approach is that Parliament does not vote probabilities; rather, MPs vote dollar amounts for some spending periods, as well as formulas for tax changes and other transfers. When the minister of finance presents a fiscal plan, that plan must contain numbers, not shaded areas around lines or under curves representing distributions of possible outcomes. Clearly, the probabilistic modelling illustrated above should occur at an earlier stage than the preparation of the fiscal plan.

If modelling and designing the fiscal plan became more clearly distinct activities, there would be advantages to putting each activity under the control of a separate agency, rather than combining them in the Department of Finance. Although it is important, as O'Neill (2005) argues, that the department should continue to be the agency responsible for establishing the fiscal backdrop — after all, MPs and Canadians need the agency responsible to be accountable for its work — its role would be simpler and less problematic if a separate agency undertook the early-stage modelling.

Such an institutional separation would avoid the appearance of conflict of interest that is inevitable when the agency that lays out the budget plan also has charge of the background forecasting. Even if there were no evidence of deliberate pessimistic shading, as in the fiscal plans of the past decade, the Department of Finance would still struggle to establish credibility if it warned that the bottom line was getting close to the red.

An institutional separation would also avoid the awkwardness that would arise if the department acknowledged publicly all the things it did not know about the economy and fiscal policy. The potential for income shifting and uncertain investment responses, for example, makes it hard to predict the revenue impact of changes in corporate income tax rates. A minister of finance who introduced a tax change of that kind would be politically vulnerable if his own officials admitted they did not know what impact such a move would have on the budget. Uncertainties built into a model by a separate agency, however, would not have the same potential for embarrassment nor would they stop the Department of Finance from developing its own view.

Canada's different political structure makes the US Congressional Budget Office an awkward example to emulate, but there are precedents here at home. The Office of the Chief Actuary in the Office of the Superintendent of Financial Institutions, for example, provides triennial forecasts of the long-term prospects for the Old Age Security/Guaranteed Income Supplement system and for the Canada Pension Plan. Such an agency could develop internal expertise and involve outside experts in its exercises. Doing so would provide some assurance that the values selected for variables in the economic and fiscal model reflected disinterested research rather than the desire for a certain outcome. Moreover, it would draw out into the open uncertainties that are useful to discuss.

Such an agency would also complement other federal bodies — the Department of Finance and Treasury Board — that have institutional commitments to fiscal integrity. It could play a public role in the pre-budget process that the Department of Finance cannot. Once the new agency had made public its projections for the economic and fiscal outlook on an as-is policy assumption, the minister of finance could then set a fiscal course that made the odds of the government's preferred outcome comfortably high. And if the new agency published error bands around its forecasts, a bottom line that missed the government's point forecast but was respectably close to it would create less pressure to spend more when times are good and cut back when times are bad.

## Conclusion

Ottawa's spending overruns of the recent past show that its hell-or-high-water budgetary framework is no longer helpful to Canada's long-term fiscal and economic health. The approach that once made it easy for a finance minister to say "no" now seems to make it next to impossible not to say "yes." Fiscal policy that does not permit revenue and spending to respond to unexpected events by fluctuating in opposite directions is dysfunctional, and when it has a bias toward surprises that trigger ad hoc outlays, it promotes growth of government that is independent of dispassionate analysis of the country's needs.

One promising alternative is a fiscal framework that formally acknowledges uncertainty and chooses paths for taxes and spending that offer comfortable odds of achieving benchmarks such as a lower debt ratio at some future date, or no more than one deficit in a given period. Among other virtues, such a framework would reduce the embarrassment of small deviations from annual targets and the associated temptation to make last-minute changes in spending to hit them. If such a framework is too awkward for Canada's current institutional structure, a separate entity charged with uncertainty-based forecasting would be a useful innovation.

By commissioning the O'Neill (2005) study and by introducing ad hoc legislation to legitimate its increasingly large in-year fiscal zigzags, the federal government has implicitly acknowledged the shortcomings of its current framework. It has since rejected several of O'Neill's core recommendations, however, and the approach in Bills C-48 and C-67 offers Canadians very poor odds of escaping the fiscal trap they are now in. A new framework could help them beat those odds.

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## NOTES

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